REMARKS

Claims 1-22 are pending in the current application. In the Office Action dated June 5, 2003, the Examiner maintained a restriction requirement, objected to the drawings with regard to claim 22, objected to claims 1, 11, 16, and 16 for informalities, rejected claims 3, 5-10, 12-14, 19, 21, and 22 rejected claims under 35 USC §112, second paragraph, rejected claims 1-5, 7-16, 18, 19, and 21 under 35 USC §102(b) as being anticipated by Hirokazu et al., JP 04-009666, rejected claim 6 under 35 USC §103(a) as being unpatentable over Hirokazu in view of Halbartschlager et al., U.S. Patent No. 3,700,089, Runyon et al., U.S. Patent No. 5,101,975, and Kauhaniemi, U.S. Patent No. 5,880,829, rejected claims 17 and 20 under 35 USC §103(a) as being unpatentable over Hirokazu in view of Haines, U.S. Patent No. 3,924,746, and finally rejected claim 22 under 35 USC §103(a) as being unpatentable over Hirokazu in view of Barlow, U.S. Patent No. 4,434,893 and/or Wood, U.S. Patent No. 4,169,531. In the above amendments, Applicants' representative has canceled claim 22, hopefully removing the objection to the drawings, objections to claims 1, 11, 16, and 16 for informalities, and all but one set of rejections of the claims under 35 USC §112. Applicants' representative respectfully traverses the 35 USC §102 and 35 USC §103 rejections.

Applicants' representative feels obligated to compliment the Examiner for a very thorough reading of the claims. Applicants' representative is chagrined to learn of so many small, but nevertheless annoying errors identified by the Examiner, and has endeavored to correct them all, in the above amendments.

With regard to the Examiner's 35 USC §112, second paragraph, rejection claims 5-10, 12, 14, 19, and 21 in section 10. of the Office Action, Applicants' representative admits to being confused. The term "feature" generally refers to an element of a manufactured product, such as a fin, protrusion, dimple, etc. In the current application, in sentences beginning on page 4, line 17 and page 5, line 12, provided below, the claimed features are described as follows:

> The microarray strip may include one or more linear sequences of regularly-spaced tractor feed perforations, or other features that can be automatically sensed, to allow for precise mechanical translation and positioning of the

embedded microarrays within a mechanical device.

> The microarray strip further includes tractor feed perforations or other regularly spaced mechanical or optical features that allow the microarray strip, and the microarray contained within the microarray strip, to be mechanically translated and precisely positioned within various automated electromechanical systems.

The term "feature" is analogous to the term "fastener." A feature may be a manufactured bump, translucent region in an otherwise opaque material, a fin, an aperture, or other manufactured element of a product, just as a fastener may be a nail, a screw, a bolt, glue, etc. While claim 5 recites "regularly spaced features that facilitate automatic translation and positioning of the microarray strip," claim 6 recites " wherein the regularly spaced features comprise two sets of tractor feed perforations along each edge of the microarray strip," just as one might claim a fastener in a first claim, and, in a subsequent, dependent claim, claim "wherein the fastener is a nail." Applicants' representative apologizes for being obtuse, if he is missing something more fundamental, but finds the use of the term "feature" to be quite clear and well defined in the claims. Perhaps the Examiner can elaborate, or propose an alternative word or phrase that the Examiner would find more acceptable.

With regard to the Examiners 35 USC §102(b) rejections and 35 USC §103(a) rejections, Applicants' representative's argument is quite simple and straightforward. The Examiner, in the second sentence of section 18 of the Office Action, states that "Hirokazu et al. disclose a microarray strip containing a number of microarrays," and makes similar statements subsequently, depending on Hirokazu as disclosing a microarray strip containing a number of microarrays for all of the 35 USC §102(b) and 35 USC §103(a) rejections. However, Hirokazu does not disclose anything related to, or containing microarrays. In the abstract, Hirokazu explicitly states "The inside surfaces of the respective wells of a microplate ...," and, in Figure 1, clearly and distinctly illustrates a microplate with wells. A microplate is not a microarray, and microplates are not even remotely related to microarrays. Microarrays are thoroughly described in the Background of the Invention section of the current application:

> Microarrays are widely used and increasingly important tools for rapid hybridization analysis of sample solutions against hundreds or thousands of

precisely ordered and positioned features on the active surfaces of microarrays that contain different types of molecules. Microarrays are normally prepared by synthesizing or attaching a large number of molecular species to a chemically prepared substrate such as silicone, glass, or plastic. Each feature, or element, on the active surface of the microarray is defined to be a small, regularly-shaped region on the surface of the substrate. The features are arranged in a regular pattern. Each feature may contain a different molecular species, and the molecular species within a given feature may differ from the molecular species within the remaining features of the microarray. In one type of hybridization experiment, a sample solution containing radioactively, fluorescently, or chemoluminescently labeled molecules is applied to the active surface of the microarray. Certain of the labeled molecules in the sample solution may specifically bind to, or hybridize with, one or more of the different molecular species in one or more features of the microarray. Following hybridization, the sample solution is removed by washing the surface of the microarray with a buffer solution, and the microarray is then analyzed by radiometric or optical methods to determine to which specific features of the microarray the labeled molecules are bound. Thus, in a single experiment, a solution of labeled molecules can be screened for binding to hundreds or thousands of different molecular species that together compose the microarray. Microarrays commonly contain oligonucleotides or complementary deoxyribonucleic molecules to which labeled deoxyribonucleic acid and ribonucleic acid molecules bind via sequence-specific hybridization.

Generally, radiometric or optical analysis of the microarray produces a scanned image consisting of a two-dimensional matrix, or grid, of pixels, each pixel having one or more intensity values corresponding to one or more signals. Scanned images are commonly produced electronically by optical or radiometric scanners and the resulting two-dimensional matrix of pixels is stored in computer memory or on a non-volatile storage device. Alternatively, analog methods of analysis, such as photography, can be used to produce continuous images of a microarray that can be then digitized by a scanning device and stored in computer memory or in a computer storage device.

Microarrays are often prepared on 1-inch by 3-inch glass substrates, not coincidentally having dimensions of common glass microscope slides. Commercial microarrays are often prepared on smaller substrates that are embedded in plastic housings. Figure 1 shows a common, currently available commercial microarray packaged within a plastic housing. The microarray substrate 101 is embedded within the large, rather bulky plastic housing 102 to form an upper transparent cover over an aperture 103 within the plastic housing 102. The features that together compose the microarray are arranged on the inner, or downward surface of the substrate 101, and are thus exposed to a chamber within the plastic housing 102 comprising the microarray substrate 101 and the sides of the aperture 104-107. A transparent bottom cover may be embedded in the lower surface of the plastic housing to seal the chamber in order to create a small reaction vessel into which sample solutions may be introduced for hybridization with molecular species bound to the substrate of the microarray.

> Thus, the plastic housing serves to package the microarray and protect the microarray from contamination and mechanical damage during handling and storage and may also serve as a reaction chamber in which sample solutions are introduced for hybridization with features of the microarray. The plastic housing may further serve as a support for the microarray during optical or radiometric scanning of the microarray following exposure of the microarray to sample solutions. Scanning may, in certain cases, be carried out through the substrate of the microarray without a need to remove the microarray from the plastic housing. (emphasis added)

Moreover, microarrays are well known in biological sciences, are routinely advertised in trade journals, and are unambiguously understood by thoise in experimental science to something quite different from microplates.

Microplates, by contrast, are plastic or glass slabs, of rather large dimensions, with discrete wells arrayed on one side. Microplates are used to hold sample solutions in the wells, both for chemical synthesis and analysis steps, and as a container that can be used for spectrophotometric analysis of sample solutions. The term "microplate" has a well-defined meaning in experimental sciences – a meaning that is quite distinct from the term "microarray." For one thing, microarrays do not have wells. The surface of a microarray is flat. The target molecules bound to a microarray surface may have bound solvent molecules, but are not suspended in solution, as are the samples in microplate wells. Microarrays are analyzed in very specific and well-defined microarray readers, into which no microplate known to Applicants' representative could even be inserted. Indeed, Hirozau describes the wells of the microplate as being "filled with a preserving liquid which solidifies the phase of a material reactable with ..." clearly differentiating a microplate from a microarray. A microarray does not have separate wells that could be filled with a preserving fluid. Finally, as clearly defined in the application, microarrays are not simply substrates, but are manufactured entities that include both the substrate and hundreds or thousands of different types of surface bound probe molecules. Microplates, byu contrast, are simply slabs with wells – nothing more.

The Examiner states that Hirozaku discloses a microarray strip containing a number of microarrays, but – instead – Hirokazu discloses a single microplate contained within a single vacuum-packages microplate container. There is nothing in Hirokazu to indicate or suggest a sequence of separate pockets linked together and each

containing a separate microplate.

In short – Hirokazu is as relevant to the claimed invention as a vacuum-packaged chicken or printed circuit board. It is completely irrelevant. Please note that Applicants exolictly include microarray elements in the claims. Unless a reference teaches a strip of separately enclosed containers each containing a microarray, it cannot anticipate the claimed invention, nor serve as a basis for an obviousness-type rejection.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

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